Spin Tilt Study

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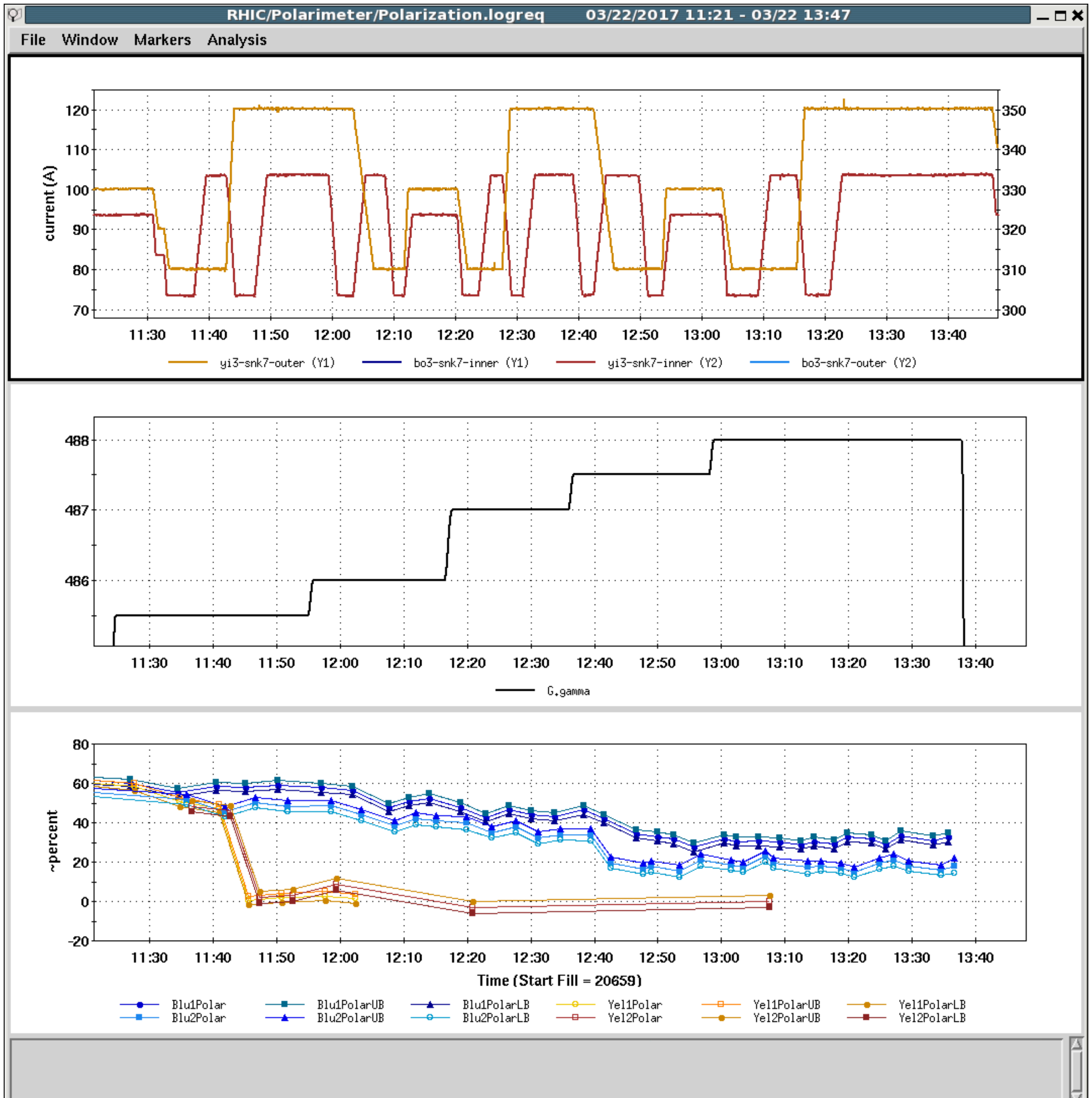


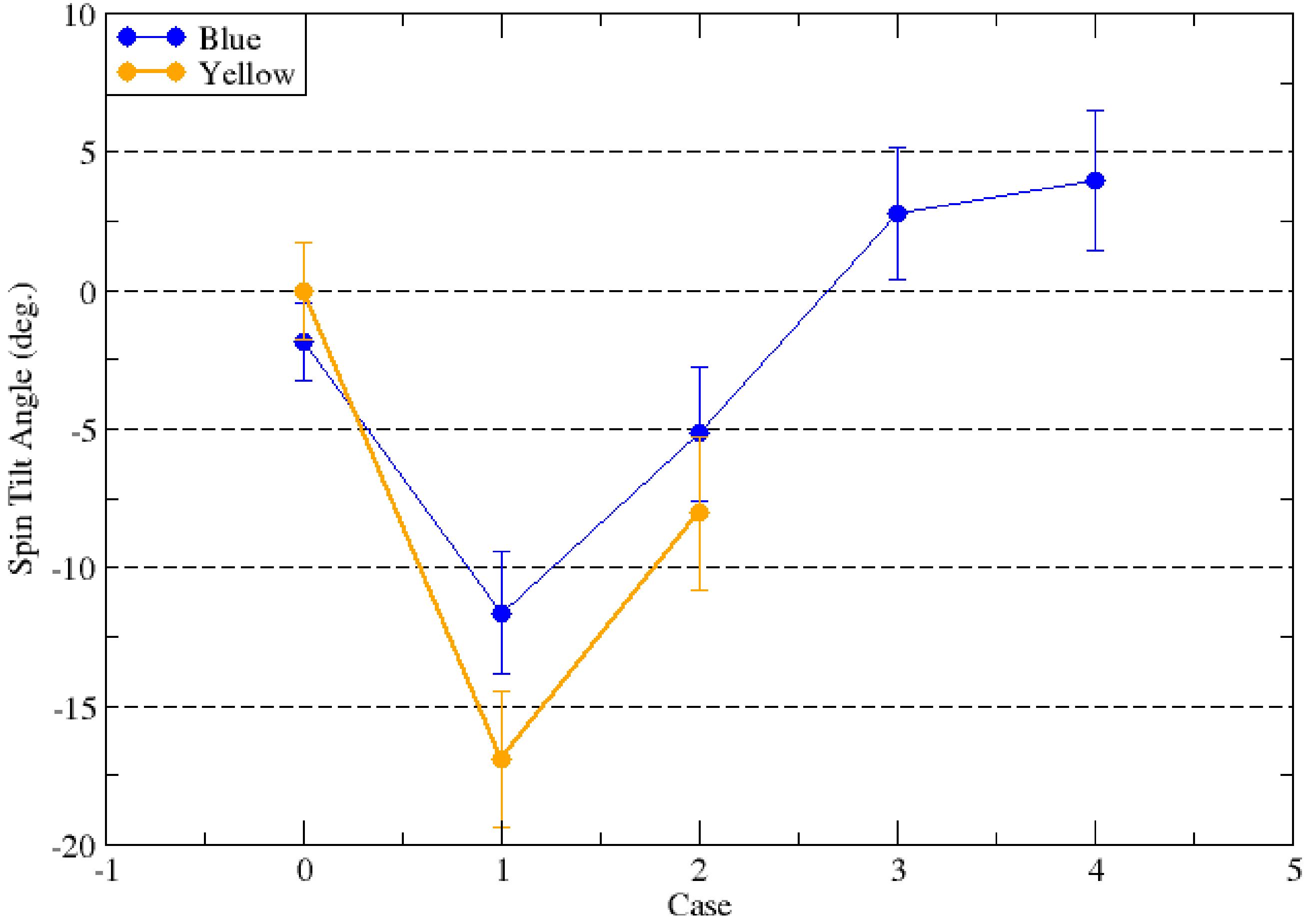
Snake Current

Beam Gγ

Polarization

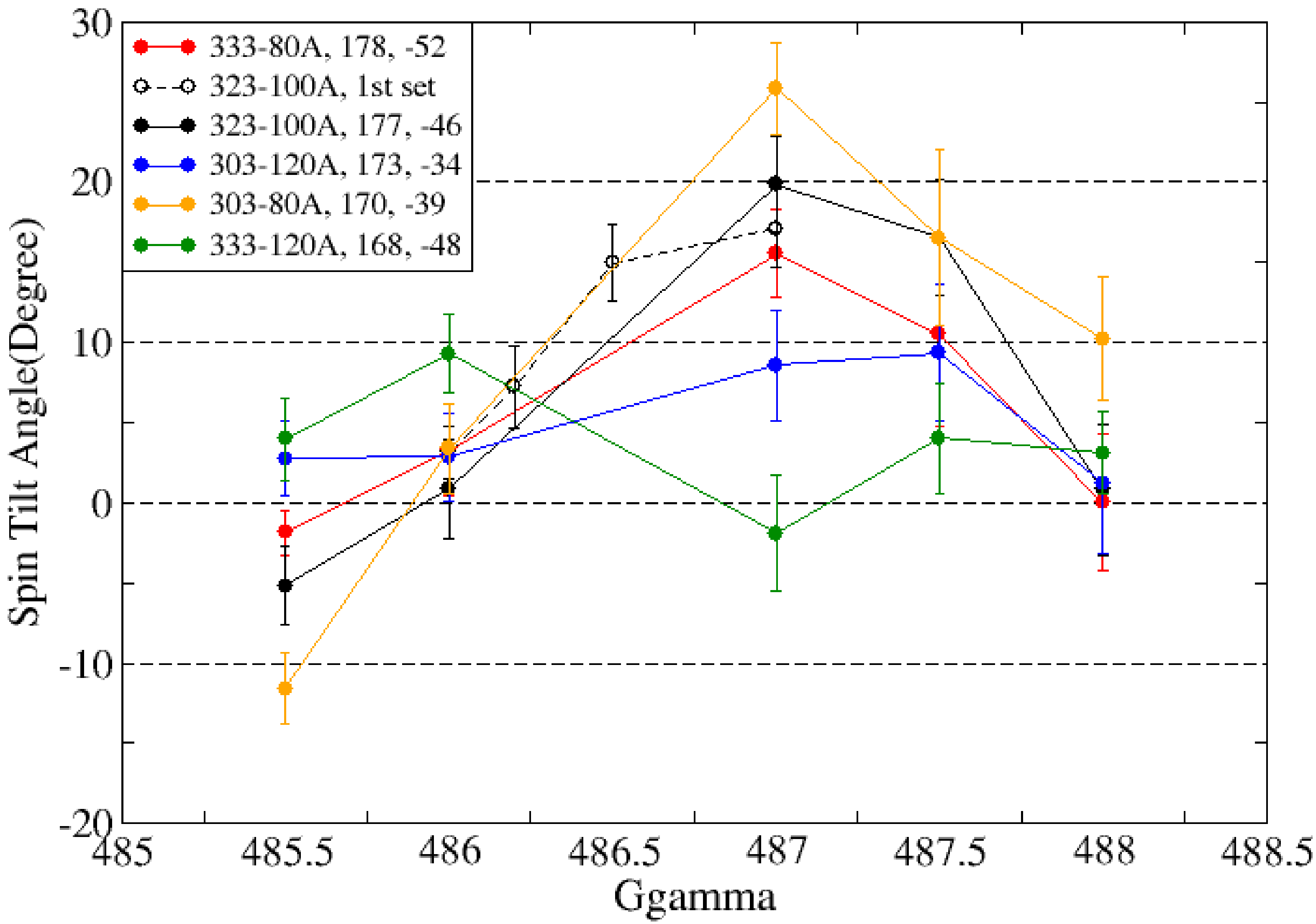
Snake Current San at Ggamma=485.5

0: 323-100A; 1: 303-80A; 2:333-80A; 3: 303-120A; 4: 333-120A



Blue and Yellow showed similar pattern for the first three cases. We lost yellow polarization when switching to the 3rd case. The 0th case is the nominal running current.

Spin Tilt Angle for Various Snake Settings



By fitting these data, we hope to get the currents required for full snake (180 degree) and proper axis(45 degree).

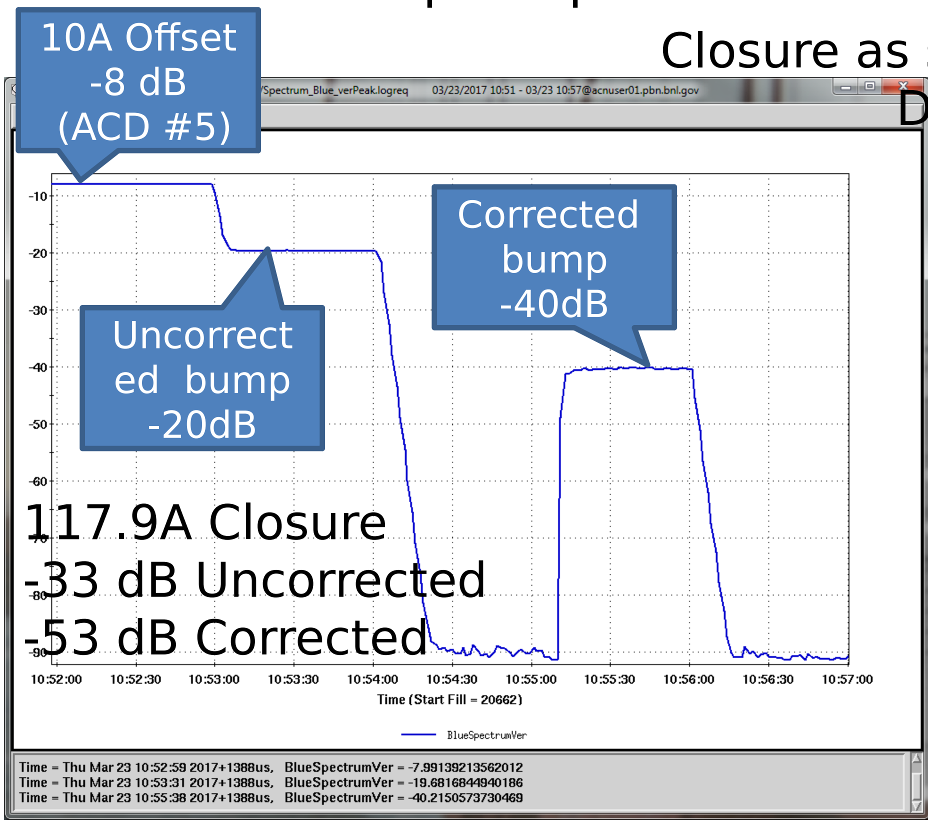
AC Dipole Bump Closure

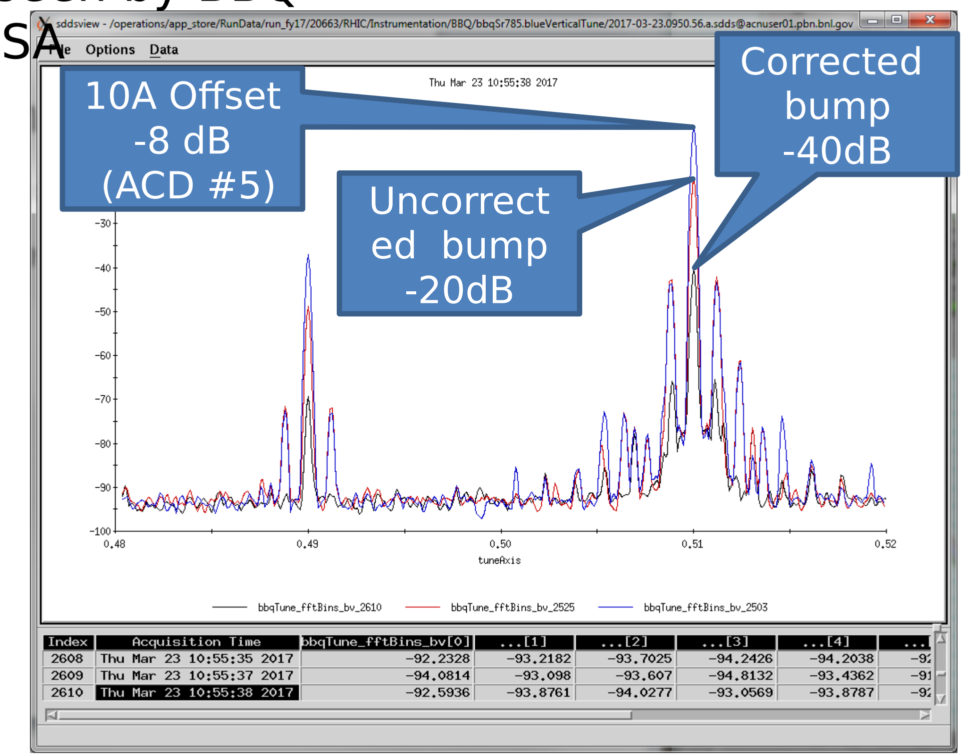
Peter Oddo

- Automated code was able to correct closure of double bump by 20dB by minimizing response of 97 BPMs
  - Max set point amplitude shift ±0.055dB
  - Max set point phase shift ±0.73° (±53ns)

Closure as seen by BBQ

DSA

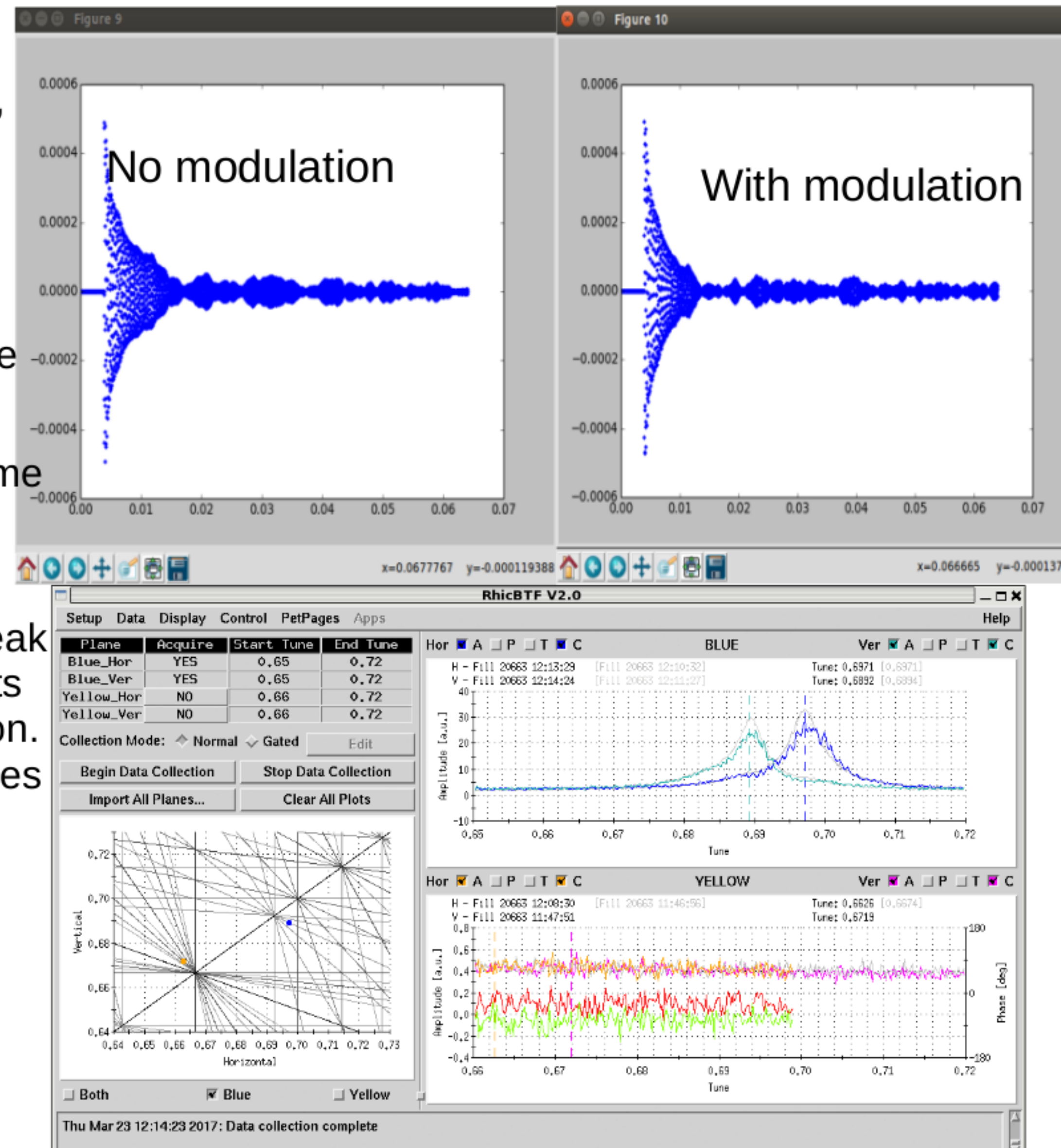




Fighting instability by modulating sextupoles

Chuyu, Al, etc.

- Running with small chromaticity greatly improves the beam lifetime at low energy, however, it is more likely to encounter instability problem. This modulation of sextupole is aiming to stabilize the beam.
- Modulation of sextupoles at synchrotron frequency introduce tune spread for single particles.
- It is shown in simulation the coherence time is shorter with modulation.
- In the experiment, IR sextupoles were modulated to generated 1 unit peak-to-peak chrom sine wave. The BTF measurements were done with and without the modulation. Color traces are with modulation, grey ones are without modulation of sextupoles

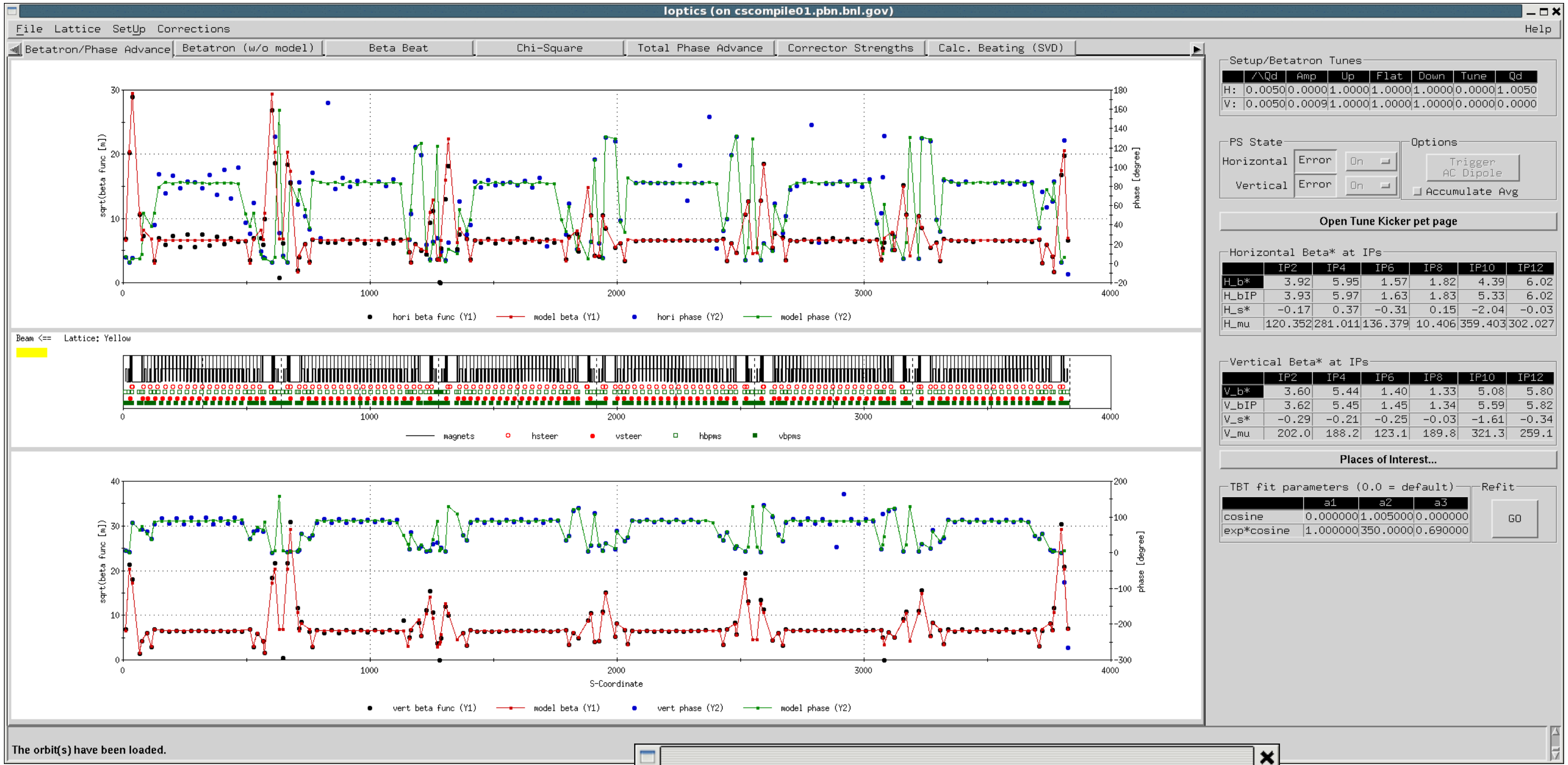


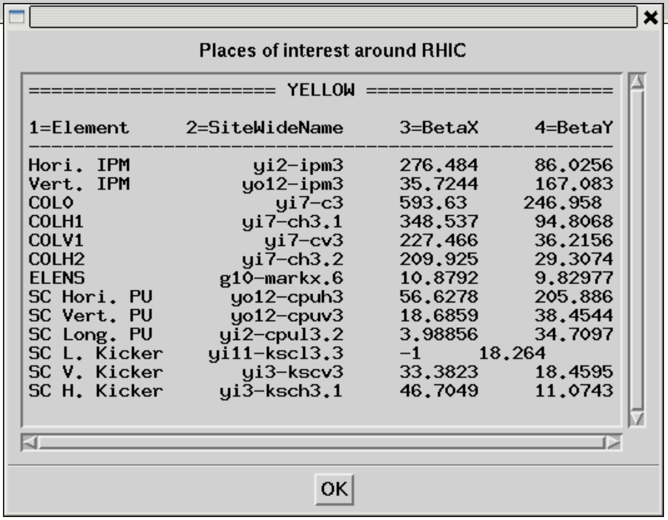
HOBBC experiments at 255 GeV

Xiaofeng, Wolfram, Peter, Al, etc

- Test of lattice
  - Dynamic Aperture (in operations with 1 BB collision)
  - Polarization and polarization lifetime (in operation)
  - Phase advance IP8 to e-lens (setup or APEX)
- Effect of e-beam on p-beam tune distribution (BTF)
  - Change in distribution with I_e and σ_e
  - BB footprint compression with e-lens
- Max beam-beam parameter ξ_p with 2 BB collisions and with and without e-lens
  - Need maximum available ξ_p,
    i.e. $N_b \geq 2.5\text{-}3.0\text{x}10^{11}$ with ε_n = 2.5 μm
  - ~28x28 bunches, short stores (~10 min)
    get data for plot like this (much fewer points) =>
- Measurement of BB Resonance Driving Terms
- Test of beam stability

2017 lattice (yellow)




Places of interest around RHIC

====================== YELLOW ======================

1=Element	2=SiteWideName	3=BetaX	4=BetaY
Hori. IPM	yi2-ipm3	276.484	86.0256
Vert. IPM	yo12-ipm3	35.7244	167.083
COL0	yi7-c3	593.63	246.958
COLH1	yi7-ch3.1	348.537	94.8068
COLV1	yi7-cv3	227.466	36.2156
COLH2	yi7-ch3.2	209.925	29.3074
ELENS	g10-markx.6	10.8792	9.82977
SC Hori. PU	yo12-cpuh3	56.6278	205.886
SC Vert. PU	yo12-cpuv3	18.6859	38.4544
SC Long. PU	yi2-cpul3.2	3.98856	34.7097
SC L. Kicker	yi11-kscl3.3	-1	18.264
SC V. Kicker	yi3-kscv3	33.3823	18.4595
SC H. Kicker	yi3-ksch3.1	46.7049	11.0743

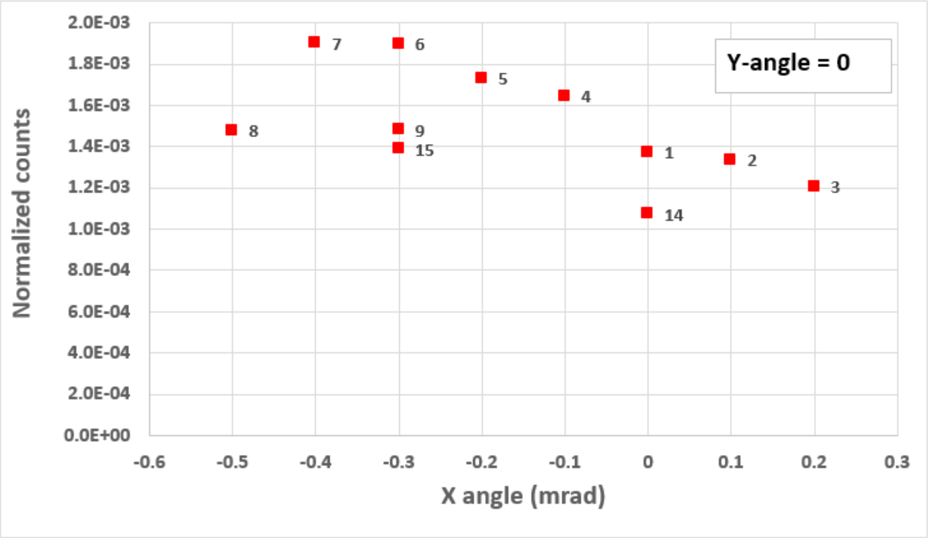
OK

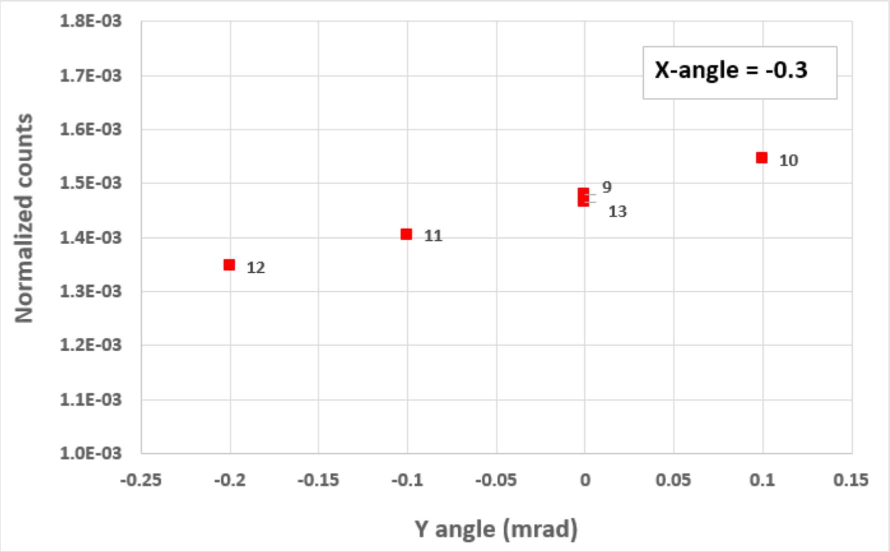
eBSD Alignment (Yellow)

Angle values in the Yellow alignment scan:

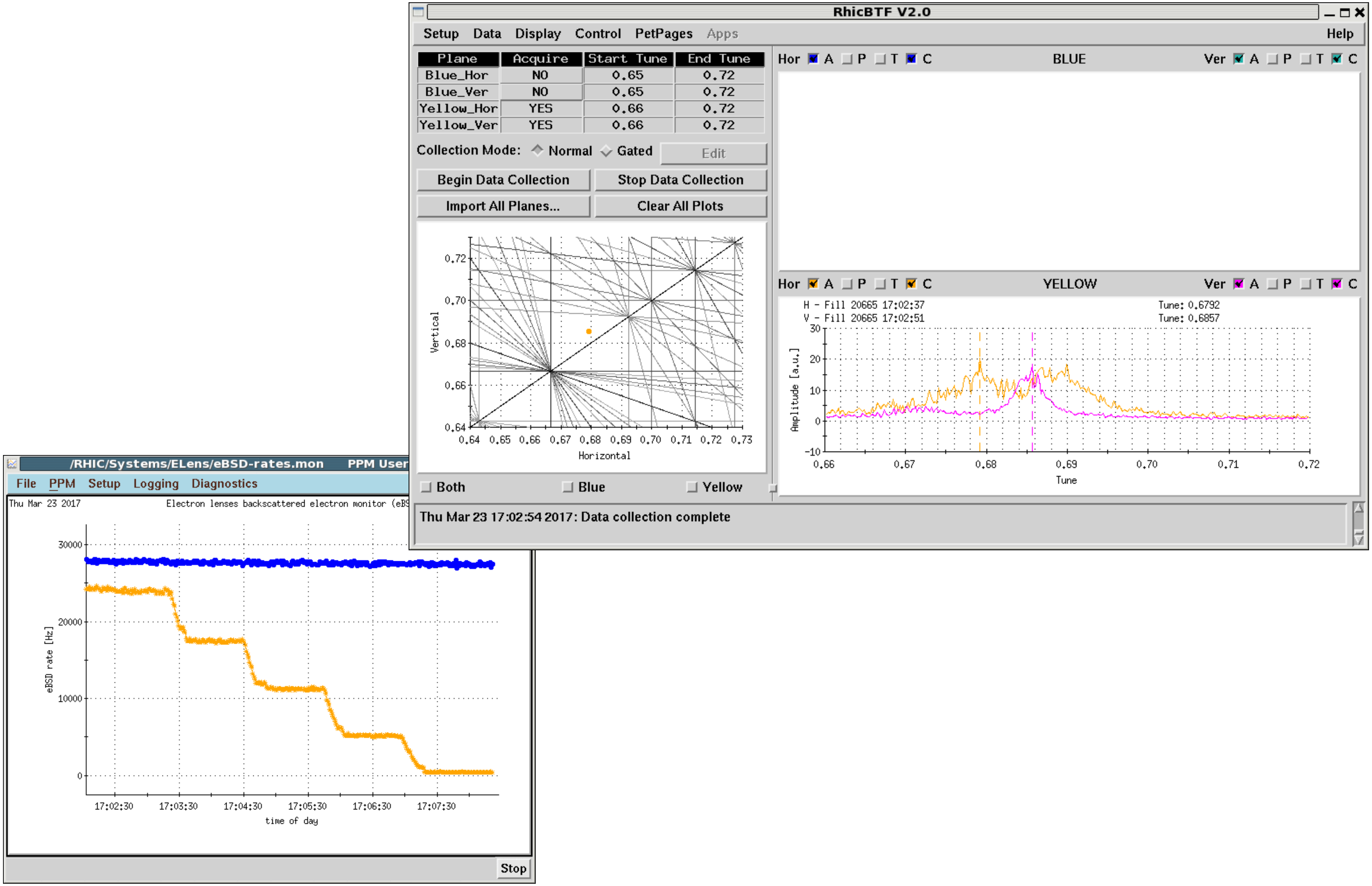
A. hor scan: 0.0, +0.1, +0.2, -0.1, -0.2, -0.3, -0.4, -0.5 mrad
At each step x-y position optimization with LISA.
Set to -0.3 mrad.

B. ver scan: 0.0, +0.1, -0.-1, -0.2 mrad (see increased losses at +0.1 and -0.2 mrad)
At each step x-y position optimization with LISA.
Set to 0 mrad





BTF


RhicBTF V2.0
Setup Data Display Control PetPages Apps Help
Plane | Acquire | Start Tune | End Tune
Blue_Hor | NO | 0.65 | 0.72
Blue_Ver | NO | 0.65 | 0.72
Yellow_Hor | YES | 0.66 | 0.72
Yellow_Ver | YES | 0.66 | 0.72
Collection Mode: Normal Gated Edit
Begin Data Collection
Stop Data Collection
Import All Planes...
Clear All Plots
Vertical
Horizontal
Both Blue Yellow
Hor A P T C BLUE Ver A P T C
Hor A P T C YELLOW Ver A P T C
H - Fill 20665 17:02:37 Tune: 0.6792
V - Fill 20665 17:02:51 Tune: 0.6857
Amplitude [a.u.]
Tune
Thu Mar 23 17:02:54 2017: Data collection complete
/RHIC/Systems/ELens/eBSD-rates.mon PPM User
File PPM Setup Logging Diagnostics
Thu Mar 23 2017
Electron lenses backscattered electron monitor
eBSD rate [Hz]
17:02:30 17:03:30 17:04:30 17:05:30 17:06:30 17:07:30
time of day
Stop